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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,296	02/06/2004	Ramesh B. Poola	GP-304476	5419
26568	7590	09/28/2006	EXAMINER	
COOK, ALEX, MCFARRON, MANZO, CUMMINGS & MEHLER LTD SUITE 2850 200 WEST ADAMS STREET CHICAGO, IL 60606			MCMAHON, MARGUERITE J	
			ART UNIT	PAPER NUMBER
			3747	

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,296

Applicant(s)

POOLA ET AL.

Examiner

Marguerite J. McMahon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 13-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 13-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

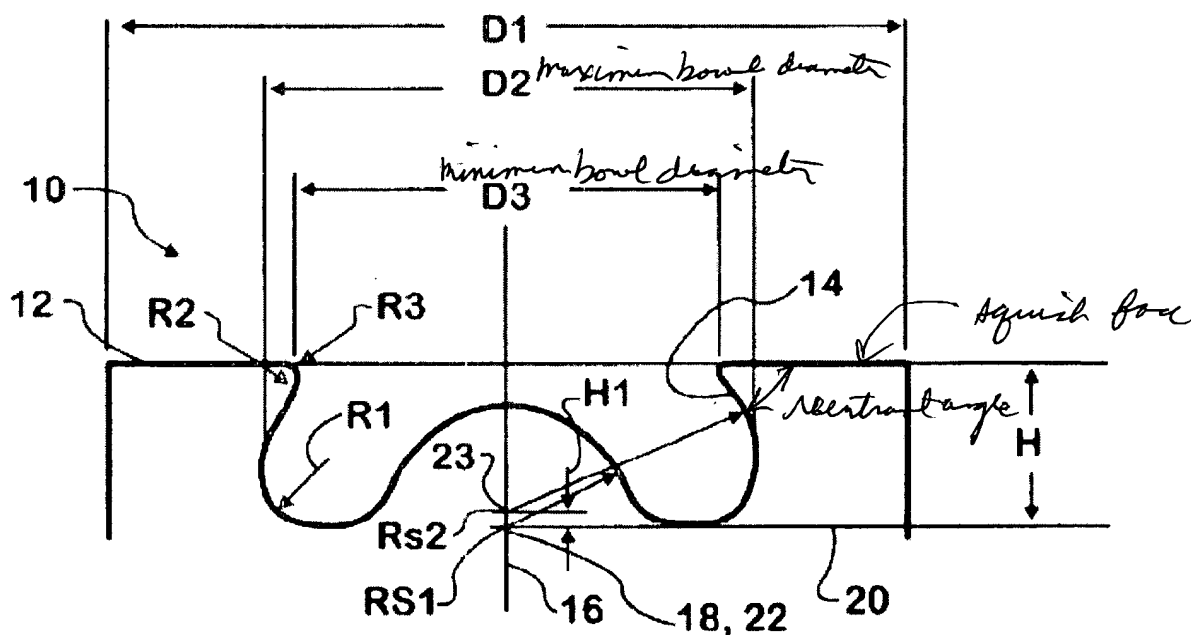
Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

Claims 1-4 and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al (6,513,476) in view of Mielke (5,778,846). Note a recess defined below the piston squish face and in relation to the bowl sidewall, and a substantially frustoconical inner surface bounded within said bowl sidewall and about the centerline. See the Figure below, and column 1, lines 55-59, which state that the chamber within the piston crown is symmetrical with respect to a combustion chamber central axis.



Liu et al show everything disclosing the cooling chamber positioned below the piston squish face, a substantially frustoconical inner surface between the maximum bowl depth and the centerline, the reentrant angle, the diameter of the piston, the

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ranges for the maximum and minimum bowl radii, the upper and lower curve radii, and the bowl depth.

Mielke teaches that it is old in the art to utilize a cooling chamber 42 positioned below the piston squish face and a substantially frustoconical inner surface between the maximum bowl depth and the centerline. It would have been obvious to one having ordinary skill in the art to employ a cooling chamber positioned below the piston squish face in order to absorb the heat of combustion during engine operation, and to employ a substantially frustoconical inner surface between the maximum bowl depth and the center line in lieu of the more rounded shape shown in Liu, as the two are art recognized alternatives, known for the same purpose.

In addition, it would have been an obvious matter of design choice to employ a reentrant angle of about 50 degrees to about 70 degrees, since Liu appears to be within the same range, and it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Furthermore, the specific ranges for the piston diameter, maximum and minimum bowl radii and upper and lower curve radii, and bowl depth, are matters of design choice, since such modifications would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Note MPEP 2144.04(IV), which states:

A. Changes in Size/Proportion

In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955) (Claims directed to a lumber package "of appreciable size and weight requiring handling by a lift truck" where held unpatentable over prior art lumber packages which could be lifted by hand because limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art.); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976) ("mere scaling up of a prior art process capable of being scaled up, if such were the case would not establish patentability in a claim to an old process so scaled." 531 F.2d at 1053, 189 USPQ at 148.).

In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al (6,513,476) in view of Mielke (5,778,846) as applied to claims 1-4 above, and further in view of Paro (5,553,585). Liu et al in view of Mielke show everything except utilizing an anti-polish ring positioned at an upper portion of the liner wall, which projects into the cylinder while the piston is recessed substantially the same distance that the ring projects, the liner wall having an annular slot which receives the anti-polish ring. Paro teaches that it is old in the art to employ an anti-polish ring positioned at an upper portion of the liner wall, which projects into the cylinder while the piston is recessed substantially the same distance that the ring projects, the liner wall having an annular slot which receives the anti-polish ring. It would have been obvious to one of ordinary skill in the art to modify Liu et al in view of Mielke by employing the anti-polish ring of Paro, in order to remove carbon deposits from the piston. Furthermore, it would have

been obvious to one of ordinary skill to form the ring integrally with the liner, as this is an art recognized equivalent to forming the ring separately and later joining it with the liner, known for the same purpose, as evidenced by applicant claiming both alternatives.

Response to Arguments

Applicant's arguments filed 8/14/06 have been fully considered but they are not persuasive.

Applicant argues that it is longstanding practice in the art of diesel engine engineering to provide diesel engines having piston diameters of more than 180 mm with an obtuse re-entrant angle of the crown bowl side. The examiner notes that it is common to provide all engines, both diesel and gasoline, of any diameter piston with an obtuse re-entrant angle of the crown bowl side. This is a conventional piston feature. Thus, the relevance of this argument is unclear.

Applicant further argues that creating a larger piston bowl requires more than merely scaling a smaller piston bowl up. "For example, Applicants' invention additionally includes a recess or a cooling chamber for cooling their larger sized piston bowl." As this feature is shown by the Mielke reference, this argument is moot.

Applicant, in the course of this statement, incorrectly assumes that Liu (6,513,476) is directed to a small or medium bore high engine speed engine. Liu is not limited to small or medium bore engines, since the Liu reference does not specify the piston diameter or anywhere indicate a size preference for the piston. (Liu is also silent as to the speeds utilized.)

Applicant also argues, with respect to claims 19 and 20, that the bowl inner wall of Liu is not substantially frustoconical because the walls of the bowl are curved. This feature is shown by the Mielke reference, so the argument is moot.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marguerite J. McMahon whose telephone number is 571-272-4848. The examiner can normally be reached on Monday-Wednesday and Friday, 10am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Cronin can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


MARGUERITE MCMAHON
PRIMARY EXAMINER